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DISCUSSION AND CORRESPONDENCE A CASE OF SYNCHRONIC BEHAVIOR IN PHALANGIDÆ

A RECENT article in this journal by Wallace Craig on "Synchronism in the Rhythmic Activities of Animals" recalls to mind an observation that I made near Austin, Texas, in 1909. At the time of the observation I made some field notes from which the following description is taken.

While engaged in hunting various species of rock lizards I located a vast colony of "harvestmen," which I identified as belonging to the genus *Liobunum*, resting during the day on the under side of an overhanging shelf of rock on a precipitous hillside. In a somewhat circular area of nearly five feet in diameter the harvestmen were packed closely together in almost unbelievable numbers. I estimated that there were between one and two thousand in the colony. When I first saw them they were all hanging from the ceiling, as it were, perfectly motionless, but when I came within about six feet of them they began a curious rhythmic dance. Without changing their foot-holds they raised their bodies up and down at the rate of about three times a second, and, curiously enough, the movement of the entire lot was in the most perfect unison. This performance was kept up for over a minute and then stopped gradually as though from exhaustion. I then poked a few of the nearest individuals with a stick and these immediately resumed the rhythmic up-and-down movement, which spread quickly over the whole group, but died down in less than half a minute. When I once more stirred up a few individuals they gave a few rhythmic responses, which stirred the whole colony again, but only slightly. After this a number of individuals began to crawl about and it was no longer possible to stimulate the rhythmic behavior.

When the colony was first seen it was noted that the long legs of neighboring individuals were closely interlocked and this mechanism was sufficient to account for the transmission of stimuli from one part of the colony to another. It should be noted especially that the rhythm was not perfectly synchronous at the

beginning, but became so after a few seconds.

Possibly synchronic flashing in fire-flies may be explained as the result of a somewhat similar transmission of stimuli. One flash stimulates others, which at first might lag slightly; but soon a synchronism is built up in a limited region, such as one bush or one tree. Such a synchronism might be transmitted to a whole field.

It would be interesting to know whether any other naturalist has observed the type of behavior herewith described for the Phalangidæ.

H. H. NEWMAN

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THE SUPPOSED SYNCHRONAL FLASHING OF FIREFLIES

I WAS very much interested in reading the article by H. A. Allard, entitled "The Synchronal Flashing of Fireflies," which appeared in SCIENCE, November 17, 1916. Some twenty years ago I saw, or thought I saw, a synchronal or simultaneous flashing of fireflies (*Lampyridæ*). I could hardly believe my eyes, for such a thing to occur among insects is certainly contrary to all natural laws. However, I soon solved the enigma. The apparent phenomenon was caused by the twitching or sudden lowering and raising of my eyelids. The insects had nothing whatsoever to do with it. Many times in the past twenty years I have proved that my solution was correct.

PHILIP LAURENT

TRIMMED MAGAZINES AND EFFICIENCY EXPERTS

To THE EDITOR OF SCIENCE: I have been reading your article on page 13 of SCIENCE for January 5 entitled "Science and the Cost of Paper" and am very sorry that the price of paper has increased to such an extent that you have to make a material change in SCIENCE. I understand your position and am not objecting the slightest to what you are doing; but I do want to make a protest against this popular efficiency humbug, because it seems to me that people are running the efficiency matter into the ground. It's all nonsense for any efficiency expert to say that the opening

of SCIENCE by hand cost scientific men \$10,000 per year. Of course it might if men sat down and opened the magazine and then afterwards read it through, but I have always found that I got more out of an unopened magazine than an opened one, because I would more carefully examine a magazine that I had to open than one that was opened; because, as I opened it, I either read the magazine, or if I didn't want to read the articles, got a rough idea of them as I opened the magazine, and for that reason whenever possible I try to get an unopened magazine.

We are losing in this nonsense regarding efficiency a good deal of the human interest in men in our employ and it's a great question to my mind if efficiency is not doing more damage than good.

H. P.

[The editor shares to a certain extent his correspondent's prejudice against trimmed magazines and efficiency experts. An untrimmed journal looks as if it were waiting for careful reading and the binder; a trimmed one for a hasty glance and the waste-paper basket. This, however, is a matter of association, which is already changing with general usage. Trimmed magazines and efficiency experts have apparently arrived. We must get used to the one and treat the other with discretion.]

SCIENTIFIC BOOKS

Die Kultur der Gegenwart. Herausgegeben von PAUL HINNEBERG. Teil III., Abtlg. III. Physik, S762. Teubner, 1915.

During the past two years much has been written about Kultur. There has been a tendency in the English-speaking world to identify it with "culture," a term which with us is variously defined. While our dictionaries may give as the equivalents of culture the following: knowledge, development, the training of the mind, the intellectual side of civilization—the more common use of the English word is associated with refinement, taste, manners. It is this common meaning which leads Stephen Leacock to speak of a cultured man as "one who has acquired a silk hat and the habit of sleeping in pyjamas." Associating culture with refinement we generally think of it as

denoting knowledge of fine arts, of music, literature, languages, especially *ancient* languages. Indeed, John Bright complained that the only necessary qualification of a cultured man was that he possess a *smattering* of two *dead* languages, Latin and Greek. Gradually, however, we are getting away from identifying culture with a knowledge chiefly of languages, living, dead and half dead, with taste and manners, and are coming to view it as "that complex whole which includes knowledge, belief, art, morals, law, custom and any other capabilities and habits acquired by man as a member of society." In this view we are approaching the idea of "Kultur" as set forth in this volume and its companions in the series. In passing it should be noted that even among Germans there are a variety of views concerning "Kultur." Professor Münsterberg defines it as "the consciousness of nationalism, the subordination of the individual to the national ideal." But if one desires to ascertain the meaning of "Kultur" as here set forth, one should read the 760 pages of this volume which is concerned only with physics. One then should survey the contents of the other fifty-seven volumes of the "Kultur" series.

The fifty-eight volumes comprising "Die Kultur der Gegenwart" are divided as follows: fourteen are devoted to religion, philosophy, literature, music, art; ten to history, economics, the political and social sciences; nineteen to mathematical, natural and medical sciences; fifteen to technical sciences.

In the volume under review there is presented the philosophical evolution rather than the history of physics. Ideas are traced from their origin to their present fullness. One is thus able to observe how the contributions of the succeeding centuries and decades compare with one another. It is interesting to note that in the article on mechanics, which may be regarded as the *oldest* portion of physics, thirty-six pages suffice to bring the subject to near the end of the nineteenth century and twenty-five pages are given to the development during the past generation. In the other thirty-five articles thirteen are almost en-